

Friends of Deckers Creek (FODC)
2014 Announcement of Grant Opportunity
Non-Construction NPS Project

A project eligible for Clean Water Act, § 319(h) funding
Requested by

Friends of Deckers Creek
(Lead agency)

and

The West Virginia Department of Environmental Protection
Division of Water and Waste Management
Nonpoint Source Program

In collaboration with the Deckers Creek Restoration Team

December 23, 2013

Source	Amount (\$)
319(h) Funds (AGO2014)	\$17,000
Friends of Deckers Creek (In-kind & Local Business Sponsors)	\$19,719
Total	\$36,719

WORK PLAN

For

Friends of Deckers Creek (FODC)
2014 Announcement of Grant Opportunity
Non-Construction NPS Project

This Work Plan is divided into 2 sections: Clean Creek Program and Scientific Research Analysis

Section 1: Clean Creek Program

Introduction

The Deckers Creek watershed encompasses approximately 63 square miles in Monongalia and Preston Counties, West Virginia. Friends of Deckers Creek (FODC) was established in 1995 and obtained 501(c)3 non-profit status in 2000. FODC's mission is to improve the natural qualities of, increase public concern for, and promote the enjoyment of the Deckers Creek watershed. Streams in the watershed are polluted by acid mine drainage (AMD), bacteria from combined sewage overflows, heavy metals, sediment, trash, and general abandonment. Through remediation projects, trash clean-ups, community outreach, and environmental education, FODC aims for the watershed streams to be fishable and swimmable by 2020, turning them from liabilities into community assets.

To accomplish our mission, FODC established the Clean Creek Program (CCP) in 2002. The purpose of the Clean Creek Program is to monitor the biological community and water quality of the watershed and to disseminate the findings to the general public. This instrumental program is the only ongoing FODC project designed to track trends in the water quality and biological communities of streams in the Deckers Creek watershed. This program has three components: 1) water quality monitoring and assessment of fish and invertebrate communities at 13 sites across the watershed, 2) dissemination of our findings to the community and local schools, and 3) continued capacity building with local businesses through sponsorships to restore and protect Deckers Creek. Data collected through this project are used to educate the public about the impact of AMD and other environmental pollutants, steer restoration efforts, evaluate restoration success, and educate community members, leaders, and students on the steps being made to improve current conditions and to protect Deckers Creek in the future. This model project serves to educate the community about key environmental issues in their area, the importance of watersheds and stream health, and the connections between healthy watersheds and healthy communities, while empowering the local residents and youth to become environmental stewards and make changes in the community.

Goals and Objectives

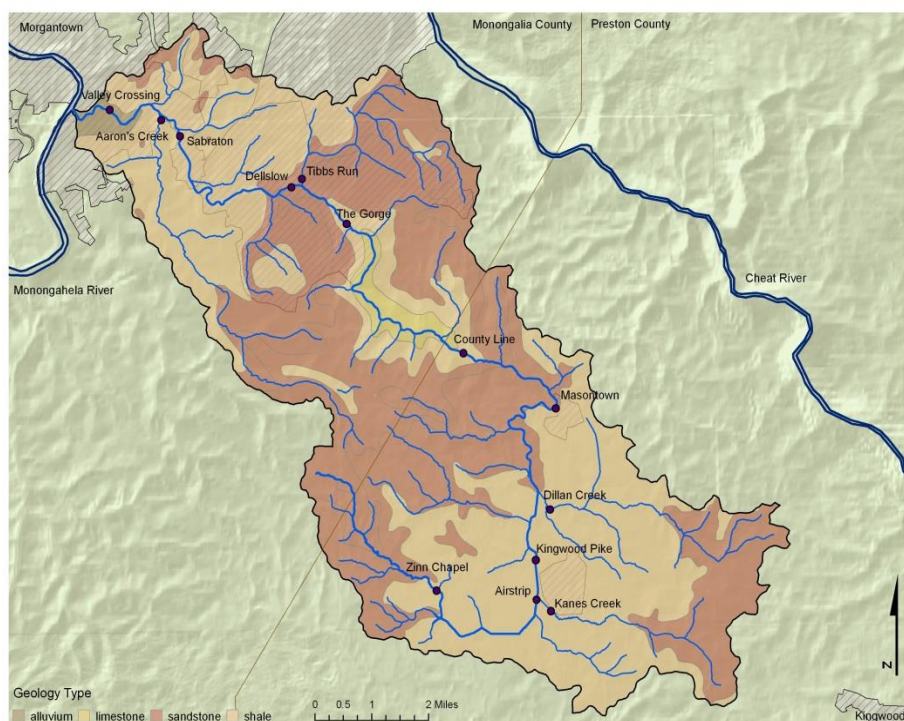
Short-term goals and objectives:

- 1) Water sampling at the 13 CCP sites quarterly
- 2) Fish sampling at the 13 CCP sites annually
- 3) Benthic macroinvertebrate sampling at the 13 CCP sites annually
- 4) Analyzing, evaluating, and illustrating collected data
- 5) Receiving local business sponsorships
- 6) Presentation of the 2014 State of the Creek data to community members
- 7) Publication and dissemination of the 2014 State of the Creek Report

Long-term goals of the project include: 1) increased community awareness and involvement especially with restoration efforts, 2) increased environmental awareness and stewardship, 3) establishing a good environmental ethos among the next generation, who will be serving as future leaders of America's watersheds, 4) increased knowledge and interest of outdoor adventure recreational opportunities in the Deckers Creek watershed especially in the gorge, 5) evaluating long term trends in the water chemistry and biological communities and developing plans of action to continue improving water and habitat quality, 6) establishing Deckers Creek as a source of community pride.

Management Measures

Water quality monitoring will occur in February, May, August, and November 2014. Each quarterly visit requires the onsite measurements of certain water quality parameters such as pH, temperature, conductivity, flow, and dissolved oxygen. We also will collect water samples from each site and take them to the WVU National Research Center for Coal and Energy for further analysis. Invertebrate communities will be assessed in the spring of 2014 using kick nets in collaboration with numerous community volunteers. Kick nets will be placed in the water, and the sediments will be stirred up by kicking the substrate. This is done three times at each site and the samples will be jarred and taken back to the lab. Once back in the lab, samples will be sorted and identified to the family level. The West Virginia Stream Condition Index (WVSCI) will be used to determine stream health and quality based on invertebrate communities at each site. FODC will assess fish communities in the fall of 2014 in collaboration with West Virginia University Wildlife and Fisheries Resources students. Fish will be collected using a backpack electro-shocker, which places an electric current into the water and stuns the fish. The stunned fish will be netted, identified by species, weighed and measured, then released, unharmed, back into the stream.



**Deckers Creek Watershed
Geology and CCP sites**

Technical Assistance

Lab analysis of water samples is completed by WVU's National Research Center on Coal and Energy (NRCCE). FODC contracts with experts to identify (family level) and count macroinvertebrate communities. Faculty and students in WVU's Department of Wildlife and Fisheries Resources assist in the annual fish surveys with equipment, fish identification, count and measurement.

Budget and Match

See page 9 for full Budget for both Clean Creek Program and Scientific Research Analysis

Education and Outreach

All the data will be summarized and published in the 2014 State of the Creek report in February 2015. Once published, the State of the Creek report will be sent to state, county and municipal leaders, local schools, libraries, interested citizens, and will be posted on FODC's web site. We also will give presentations early in 2015 based on the State of the Creek to West Virginia University courses and student organizations, community groups, local elementary, middle and high school classes and after school programs, to each sponsor, and at FODC outreach meetings. Furthermore, youth and students who volunteer with this program will gain direct hands-on experience and education in the monitoring of water quality and biological communities.

Milestone Schedule

January 2014

- Recruit volunteers for February water quality monitoring

February 2014

- Quarterly water monitoring at all 13 CCP sites.
- Data entry from field results
- Submit samples to lab for analysis

March 2014

- Receive laboratory results of water quality testing; enter into database

April 2014

- Recruit volunteers for May water quality monitoring and macroinvertebrate sampling

May 2014

- Quarterly water monitoring at all 13 CCP sites.
- Data entry from field results
- Submit samples to lab for analysis
- Annual macroinvertebrate sampling at all 13 CCP sites

June 2014

- Receive laboratory results of water quality testing; enter into database
- Sorting of macroinvertebrates

July 2014

- Recruit volunteers for August water quality monitoring and fish surveying
- Sorting of macroinvertebrates

August 2014

- Quarterly water monitoring at all 13 CCP sites.
- Data entry from field results
- Submit samples to lab for analysis
- Annual fish surveying at all 13 CCP sites
- Sorting of macroinvertebrates

September 2014

- Receive laboratory results of water quality testing; enter into database
- Complete annual fish survey (if not complete in August)
- Identification and counting of macroinvertebrates

October 2014

- Recruit volunteers for November water quality monitoring
- Identification and counting of macroinvertebrates
- Data entry of fish survey results

November 2014

- Quarterly water monitoring at all 13 CCP sites.
- Data entry from field results
- Submit samples to lab for analysis
- Identification and counting of macroinvertebrates
- Analysis of fish data

December 2014

- Receive laboratory results of water quality testing; enter into database
- Analysis of macroinvertebrate data

January 2015

- Analysis of water quality data
- Begin preparation and design of 2014 State of Creek Report
- Begin scheduling outreach presentations

February 2015

- Complete prep and design of 2014 State of Creek Report
- Print 2014 State of Creek Report
- Schedule outreach presentations

March 2015

- Outreach presentations

April 2015

- Outreach presentations

Measures of Success

The success of the project will be measured by the number of volunteers (youth and adults) taking part in the Clean Creek Program, the number of outreach presentations given on the 2014 State of the Creek, and the successful printing and distribution of the 2014 State of the Creek report. This will be documented through sign in sheets and a volunteer database.

- 1) Water sampling at the 13 CCP sites quarterly with at least 10 community volunteers who receive specialized training in stream water quality techniques,
- 2) Fish sampling at the 13 CCP sites annually with assistance from over 70 volunteers who receive specialized training in fish sampling techniques,
- 3) Benthic macroinvertebrate sampling at the 13 CCP sites annually with over 10 volunteers who receive specialized training in these sampling techniques,
- 4) Getting over 10 youth involved with stream sampling efforts for future involvement,
- 5) Presenting the 2014 State of the Creek data to over 300 community members who will be exposed to current environmental issues and outdoor recreation opportunities within the watershed, restoration efforts, and stream health,
- 6) Publication and dissemination of the 2014 State of the Creek Report with over 140 general public, local and state officials and local businesses members being informed about the current issues and trends in the watershed.

Section 2: Scientific Research Analysis

Introduction

Friends of Deckers Creek has implemented six AMD remediation projects in the upper watershed contributing to contaminate load reductions and general improvement of the water quality in Deckers Creek and its tributaries. Treatment measures utilize flushing limestone leach beds, anaerobic vertical flow wetlands (AVFW), aerobic retention ponds, open limestone channels, and hydrated lime dosers. Treatment measures are often sized by acid neutralizing capability. This AGO proposal seeks funding to evaluate the effectiveness of treatment measures and data collection techniques utilized in design of treatment measures.

Goals and Objectives

This AGO proposal seeks funding to complete two research based projects consisting of evaluating the effectiveness of an AVFW and evaluating the accuracy of lab vs. field titrations of acidity.

The Kanawha Creek Successive Alkalinity Producing System (KCSAPS) utilizes an AVFW to reduce ferric iron to ferrous and provide alkalinity. The first goal of this research is to quantify the effectiveness of the AVFW by evaluating both the overall reduction in dissolved iron and the reduction of iron species from ferric to ferrous. Objectives to meet this goal consist of monthly sampling in replicate for the AMD suite of parameters, and determination of iron species by both field and software based techniques.

The second goal of this research is to evaluate the accuracy and precision of lab based acidity titrations vs. field based acidity titrations. Accurate acidity data is crucial to the design phase of AMD remediation best management practices (BMPs) and this non-research project seeks to evaluate the accuracy and precision of current data collection techniques. Objectives to meet this goal consist of monthly sampling in replicate as part of the AVFW evaluation, but with field titrated acidity data collected as well. The Satcher Pre-Treatment Pond (SPTP) will also be evaluated for field vs. lab based acidity. The high acidity concentrations associated with SPTP qualify its vitality to this study.

Management Measures

Water quality monitoring will occur monthly from April-September 2014 at the FODC KCSAPS (Figures 1 and 2). Both the evaluation of the AVFW and the acidity titration trials will be conducted at this site, with additional acidity data collected from SPTP. Monthly monitoring allows analysis over dynamic flow conditions and temperature ranges beginning with early spring high flow and ending with early fall low flow. The winter months typically experience lower flows that rarely exceed AMD remediation system capabilities.

Two sampling locations will be monitored representing “AVFW In” and “AVFW Out.” A replicate sample will be collected at each location during each monthly sampling event. Each monthly sampling event will be conducted over two days, a pre-flush sample and a post-flush sample. Samples will be sent to WVU’s National Research Center on Coal and Energy (NRCCE) laboratory for the AMD suite analysis. The AMD suite includes lab based hot acidity titrations. To complete goal two, comparison of data collection techniques, acidity will be field titrated for each replicate at each sampling location, thereby completing both components of the non-construction research project.

Iron species will be evaluated by two methods, wet chemistry and software based analysis. Wet chemical determination of ferrous concentrations will be completed utilizing a Hach DR890 Colorimeter onsite at time of

sample collection. Software based analysis will be completed utilizing PHREEQc geochemical software which will speciate iron based on a field collected oxidation-reduction potential (ORP) reading.

Lab based acidity titrations will be completed by WVU's NRCCE laboratory method SM20-2310B. Field acidity titrations will be completed onsite at the time of sample collection using a Hach digital titrator and 1.6N sodium hydroxide.



Figure 1: Location of KCSAPS project site, located near Reedsville, WV, on the Masontown quadrangle SE section.

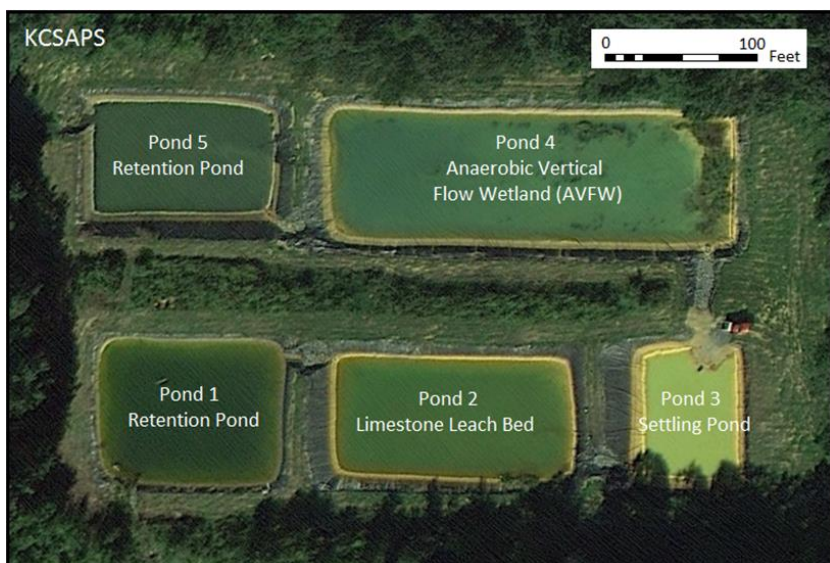


Figure 2: Kanes Creek Successive Alkalinity Producing System (KCSAPS). Evaluation of BMP effectiveness and acidity data collection techniques will be evaluated at Pond 4 (AVFW).

Technical Assistance

Lab analysis of water samples is completed by WVU's National Research Center on Coal and Energy (NRCCE). Additional labor for sampling events will be provided by FODC community volunteers and WVU students in pursuit of community service hours.

Budget and Match

See page 9 for full Budget for both Clean Creek Program and Scientific Research Analysis

Education and Outreach

Data collected and evaluated will be reported to the WVDEP in the form of semi-annual and close-out reports. Additionally, data will be presented to federal, state, and local entities at quarterly Deckers Creek Restoration Team (DCRT) meetings. Friends of Deckers Creek (FODC) also publishes a seasonal newsletter highlighting recent watershed activities and results of this study will be published therein. FODC regularly conducts public seminars and works with community volunteers at which results of the study will be disseminated.

Milestone Schedule

March 2014	Equipment and supply preparation
April 2014	Collection of field and lab data, presentation at DCRT
May 2014	Collection of field and lab data, document in WVDEP NPS semi-annual report
June 2014	Collection of field and lab data
July 2014	Collection of field and lab data, presentation at DCRT
August 2014	Collection of field and lab data
September 2014	Collection of field and lab data
October 2014	Presentation at DCRT
November 2014	Document in WVDEP NPS semi-annual report
December 2014	Evaluate results of study, document in WVDEP NPS completion report

Measures of Success

The success of this project will be measured by thorough completion of all sampling and data collection requirements. Additional aspects of successful completion incorporate participation by community and WVU volunteers, as well as education of community members through participation and public seminars. Also, FODC intends to present findings to federal, state, and local agencies through DCRT meetings, semi-annual, and close-out reports. Finally, success of the project will be validated by completion of a thorough, research style report containing all collected data, interpretation of collected data, and the future influences on BMP design, use, and potential future research projects.

Budget and Match

Cost Item	Connection	Cost Basis	Requested AGO Funds	Match	Match Source
Personnel	FODC Executive Director (15% of time)	15% of \$34,000/yr	\$ 5,100	\$ -	
	FODC Water Remediation Project Manager (10.87% of time)	10.87% of \$39,000/yr	\$ 3,000	\$ 1,240	FODC
	FODC Volunteer Coordinator	250 hours * \$10	\$ 2,500	\$ -	
	Volunteers	Valued at \$17.57/hr * 588 volunteer hours ¹		\$ 10,334	FODC Volunteers
Travel	RT Transportation for water quality sampling to CCP sites and laboratory (1 trip covers half of 13 sites)	8 trips * 40 miles * 0.565	\$ 181	\$ -	
	RT Transportation for fish sampling for equipment and to CCP sites.	12 trips * 50 miles * 0.565		\$ 339	FODC
	RT Transportation for bug sampling to CCP sites.	12 trips * 40 miles * 0.565	\$ 271	\$ -	
	Travel for State of Creek presentations. Average of 20 RT miles per presentation.	10 presentations * 20 miles * 0.565	\$ 66	\$ 81	FODC
	RT Transportation for water quality sampling to Kanes Creek SAPS site	16 trips * 38 miles * 0.565	\$ 240	\$ 100	FODC Volunteers
Supplies/Equipment	Supplies for fish and bug identification and outreach presentations	Sample jars (3 jars * \$3.49/jar * 13 sites) and ethanol (4 gallons * \$44.00/gallon)	\$ 300	\$ -	
	Water quality monitoring equipment	Spare probes for meters (1 pH * \$70 + 1 Conductivity * \$111 + 1 DO sensor * \$167)	\$ 348	\$ 600	FODC
Contractual	Macroinvertebrate identification	\$400.00		\$ 400	Local business sponsors
	State of Creek report printing	color copies (125 copies * \$9.95/copy) + postage (125 copies * \$2/mailling) + envelopes (\$0.08 * 125 copies)	\$ 1,504	\$ -	
Other	Lab Analysis of CCP water samples	2 samples/site * 13 sites * 4 samplings/yr * \$50/sample	\$ 1,000	\$ 4,200	Local business sponsors, WVDEP Stream Partners
	Lab Analysis of KC SAPS water samples	22 samples * 4/yr * \$26.59/sample	\$ 2,340		
	Copies of handouts for membership forms	500 members * \$0.10/copy * 3 drives	\$ 150	\$ -	
	Administrative Operations, Education & Outreach			\$ 2,425	FODC
Total			\$ 17,000	\$ 19,719	\$ 36,719

¹Based on State Values of volunteer time from Independent Sector: http://www.independentsector.org/volunteer_time

Budget justification

Clean Creek Program

The grant will fund FODC staff, transportation to sampling sites and presentations, equipment for water quality monitoring, fish and benthic macroinvertebrate sampling, presentations, and the printing and dissemination of the 2014 State of the Creek report. Matching funds come from local business sponsors and volunteers (total volunteer time calculated = 554 hours).

Scientific Research Analysis

Funding through the EPA and WVDEP NPS Program will cover implementation costs for analytical analysis, project manager personnel time for data collection, data interpretation, and preparation of reports, and project manager travel. Matching funds will be donated in-kind by FODC from non-federal grants funding administrative, education, and outreach programs. Additional in-kind match will be provided by volunteer labor and mileage accumulated during assistance with field sampling activities (total volunteer time calculated = 34 hours).